



Western Fisheries Research Center (WFRC)

Western Fisheries Science News



Barb White

Disease surveillance is an important piece of Puget Sound Restoration.

Advances in Salish Sea Disease Ecology

Disease outbreaks in wild animals can cause rapid, severe population declines and even extinctions. For this reason fish disease surveillance, forecasting and mitigation are important pieces of the restoration and protection of Puget Sound. WFRC scientists study many important diseases of salmon, trout and herring, including *Ichthyophonus* and viral hemorrhagic septicaemia virus (VHSV), two pathogens implicated in the collapse of Pacific herring populations in the North Pacific. Herring act as keystone species, helping structure the food web by converting zooplankton into fish protein to feed animals such as salmon and osprey. Their decline can reverberate through an entire ecosystem. Despite the large potential impacts of disease on marine species of high economic, cultural and ecological importance, relatively little is known about the disease ecology of marine systems. Much of what is known about fish disease in Puget Sound was recently summarized in a review article by WFRC scientists and a colleague titled "Infectious Diseases of the Salish Sea" (<http://dx.doi.org/10.1080/03632415.2013.826202>).

While overfishing, pollution and habitat destruction are all blamed frequently for the collapse of fisheries, disease may also play an important role. Environmental stressors interact in ways that make population-level impacts difficult to predict, particularly in relation to disease dynamics. These stressors include: reduced food availability, changes in temperature, increased contamination, heightened predation, (continued on page 2)

Honors

WFRC Researcher Received Research and Development Honor: On October 15, WFRC scientist Deborah Reusser, along with colleagues from EPA, received a bronze medal at the 32nd Annual ORD awards ceremony. The PICES/NIS synthesized the distributions and natural histories of marine/estuarine nonindigenous species in the North Pacific. For more information, contact Deborah Reusser at dreusser@usgs.gov or 541-867-4045.

In the News

KING -5 News Story: On September 27th WFRC scientist Jim Winton was featured on Seattle television station KING-5 regarding the use of a novel fish virus as a surrogate for testing antiviral drugs for control of Hepatitis E in humans. Winton, WFRC scientist William Batts and colleagues were the first to characterize the fish virus. KING-5 obtained information for the interview from a USGS Top Story (<http://goo.gl/o5i01M>). See <http://goo.gl/XexVnD>. For more information contact Jim Winton at jwinton@usgs.gov or 206-526-6282 ext.328.

WFRC Scientists Featured in PBS Science Program: WFRC scientist Jeff Duda and collaborators from NOAA and the Lower Elwha Klallam Tribe were featured in a news story about the Elwha River restoration project on the PBS television program Quest. The segment details the nation's largest dam decommissioning project and some of the research and monitoring activities that are being conducted in support of the project. For more information visit <http://goo.gl/iXqN1K> or contact Jeff Duda at jdu-da@usgs.gov or 206-526-6282 x233.

(from page 1) competition from invasive species, and disturbance from fishing or recreation. Many of these stressors can increase disease susceptibility or act synergistically to compound impacts. Disease pressures may also be magnified by the introduction of non-native pathogens through increased global trade. Not only does this introduce new pathogens to a system where native species lack natural resistance, but it may also introduce new hosts for native disease organisms and/ or create new reservoirs of disease.

In the winter of 1992/ 1993 about 60% of the Pacific herring population of Prince William Sound died. Twenty years later, populations have not recovered, and the fishery is still closed. Studies suggest that VHSV and *Ichthyophonus* have likely played a role in preventing population recovery. Direct causation is difficult to establish however; four years before the herring crash, the Exxon Valdez spilled oil into Prince William Sound. Also, in 1992, food availability was low, putting the herring in bad condition. The relative roles and relationships of these different stressors are still under debate.

There are reasons to worry about disease in Puget Sound. For one, rates of natural mortality (not due to fishing) among Puget Sound herring increased from 20-40% during the 1970s to 68% since 1990. Because most natural mortality occurred among the oldest fish, existing herring stocks are relatively young. Additionally, rates of infection with *Ichthyophonus* in Puget Sound herring stocks are as high as 48%.

VHSV poses another serious threat to the herring of the Salish Sea, which experience explosive outbreaks of infection from this virus. VHSV may persist in apparently healthy herring for long periods, erupting into a deadly epidemic when environmental conditions change (e.g. when water temperatures cool). VHSV is not specific to herring. It has a wide range of hosts in Puget Sound including sardines, sandlance, and other fish.

While WFRC studies indicate that aquatic diseases represent a significant potential threat to the ecological health of Puget Sound, more research is needed to answer critical questions about disease causation and the impacts of contaminants and climate change on disease dynamics. Regular disease surveillance and a greater understanding of the impacts of diseases are important components of the restoration of Puget Sound- an ecosystem estimated to generate well over \$10 billion in benefits annually. For more information **contact Paul Hershberger at phershberger@usgs.gov or 360-385-1007 x225.**

WFRC and U.S. EPA Make Obtaining and Working with Estuary/Watershed Data Easy: Basic descriptive data for the 350 estuaries along the U.S.'s Pacific Coast are critical to coastal-scale research and conservation planning. WFRC and EPA Western Ecology Division helped make this data accessible, with a tool called WestuRe. For more information (as well as the data/tools) visit <http://goo.gl/CiVXLv> or **contact Deborah Reusser at dreusser@usgs.gov or 541-867-4045.**

Publications

WFRC Report on White Sturgeon

Hatch-Success: WFRC completed a report titled "Effects of incubation substrates on hatch timing and success of white sturgeon (*Acipenser transmontanus*) embryos".

White sturgeon are endangered in the Kootenai River and exhibit widespread recruitment failure elsewhere in North America. The report was prepared in cooperation with the Kootenai Tribe of Idaho. Results will help support habitat restoration planning. For more information, visit <http://goo.gl/3mLTt0> or **contact Mike Parsley at mparsley@usgs.gov or 509-538-2299.**

Events

Working Group Established at Powell Center:

WFRC scientists Jim O'Connor, Jeff Duda, Amy Draut and Chauncy Anderson were awarded a Powell Center for Analysis and Synthesis working group to synthesize the key processes associated with dam removals. The USGS PI's and a Powell Center Fellow (Ryan Bellmore, WFRC) will convene a working group of dam removal experts in 2014 and 2015. For more information, see <http://goo.gl/EpChMP> or **contact Jeff Duda at jdu-da@usgs.gov or 206-526-6282 x 233.**

WFRC Open House for Science Writers:

On October 29th WFRC hosted an open house for members of the Northwest Science Writers Association (NASW). The event featured a welcome from Jill Roland, Center Director, and short presentations from seven scientists, representing a wide range of research programs. After the presentations, attendees had an opportunity for informal discussion with the scientists. For more information **contact Lisa Hayward at lhayward@usgs.gov or 206-526-6596**

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